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Project for a Europe-Africa permanent link through the Strait of Gibraltar

Note by the Secretary-General

1. The Secretary-General has the honour to transmit to the Economic and Social Council the report prepared in accordance with Council resolution 1997/48 by the Executive Secretaries of the Economic Commission for Europe and the Economic Commission for Africa on the work that has been done in connection with the project to establish a Europe-Africa permanent link through the Strait of Gibraltar (see annex).

2. The Economic and Social Council has taken an interest in this project since 1982 following a decision by the Governments of Morocco and Spain to carry out joint studies on the feasibility of the project as part of an agreement on bilateral cooperation adopted on 24 October 1980. Since then the Council has regularly requested the two regional commissions to keep track of the progress of studies relating to the project and to inform the Council of any developments.

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Annex

Project for a Europe-Africa permanent link through the Strait of Gibraltar: report on studies and activities carried out during the period 1997–1998

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Introduction

1. In its resolution 1997/48 of 22 July 1997, the Economic and Social Council requested the Executive Secretaries of the Economic Commission for Africa and the Economic Commission for Europe to take an active part in the follow-up to the project for a Europe-Africa permanent link through the Strait of Gibraltar and to report to the Council at its substantive session of 1997.

2. This report, drawn up jointly by the two regional commissions, is in response to that request and gives a brief overview of the progress made following studies carried out in 1997–1998. It also takes account of other project-related activities, in particular activities organized further to Council resolution 1997/48 under the joint auspices of the two regional commissions and the International Tunnelling Association (ITA), a non-governmental organization in consultative status with the Council.

3. It should be recalled that studies designed to advance the project have been carried out jointly by the Governments of Morocco and Spain since 24 October 1980, the date on which the two Governments adopted a bilateral agreement on the subject. This agreement, which was later expanded by a supplementary agreement of 27 September 1989, formally establishes both Governments' commitment to make a joint study of the feasibility of the project, and stipulates the creation of a standing intergovernmental Joint Committee, to be responsible for carrying out the agreement, and two State companies, one in Morocco and the other in Spain, to be responsible for conducting the studies. These companies, which have been working alongside the Joint Committee since 1981, are, on the Spanish side, Sociedad de Estudios para la Comunicación Fija a través del Estrecho de Gibraltar (SECEG), which has its head office in Madrid, and, on the Moroccan side, Société Nationale d'Etudes du Détroit (SNED), whose head office is in Rabat. The studies are carried out either by the two research companies directly, or through scientific institutions in the two countries, or national or international firms of consultants and surveyors with which the companies have concluded agreements or contracts for services.

4. Within the above-mentioned institutional framework, the studies are being carried out in phases and programmes of studies. The feasibility studies currently in progress are a follow-up to the pre-feasibility studies which were completed in 1990. The feasibility studies are being conducted in stages, the first of which was completed in 1996. The feasibility studies conducted during the first stage made it possible to select, for further study, a basic option for implementation of the permanent link project, comprising a rail tunnel bored beneath the sill of the strait.

5. This report, based on reports submitted by the two research companies in 1997 and 1998 to the Joint Committee, gives an overview of the studies and activities carried out in the context of the project and of their objectives and results and the problems encountered in implementation.

I. Project studies and activities

6. In 1997 stage two of the feasibility phase, "F2. Feasibility 2", began. In this stage and as preparation for the feasibility study on the basic option selected, work was to focus on the following aspects: (a) deep drilling, the priority nature of which had been emphasized; (b) an update and comparative analysis of construction cost estimates; and (c) an update and comparative analysis of traffic projections.

7. The deep drilling survey, BUCENTAURO 97, was by far the most significant activity in 1997. The survey results represented a turning point in the development of the studies. In fact, contrary to expectations based on previous studies, the deep drilling survey brought to light unexpected geological problems regarding the thickness of the Quaternary filling in the subsoil of the strait. In places this proved to exceed 100 metres, that is, much more than the 25 metres previously anticipated, and without there having been any certain determination of the maximum depth of the Quarternary filling.

8. In the light of these results, the two research companies, in July 1997, made the following proposals to the Joint Committee:

(a) Closure of the "F2. Feasibility 2" stage with the findings available at the end of 1997 and opening of a new stage designated "F3. Investigation", based essentially on clarifying the geological problems encountered and extending knowledge of the Europe-Africa traffic system related to the project, with a view to better consolidating long-term traffic projections;

(b) Adaptation of the programme of work then being carried out to the new situation, with a view to closing the stage in progress and preparing the new "Investigation" stage.

9. These proposals led to two work programmes established on the formal basis of closing the previous stage on 30 June 1998 and beginning the new stage immediately afterwards. The programmes of work are: (a) "Work plan for

stage F3. Investigation", which the companies jointly submitted to the Joint Committee in December 1998, and (b) "Work plan for conclusion of stage F2", activities under which are summarized in this report.

10. The following paragraphs offer a brief description of the development of the studies followed by the activities programmed in each area of the study process — physical environment, engineering, socio-economic aspects and evaluation; status in December 1998; and results of each activity.

A. Physical environment

11. Exploration of the physical environment constituted the major element of the work carried out by the companies, relating essentially to geotechnical, geophysical and geological investigation by means of offshore drilling. In the geotechnical area, the work carried out allowed completion of the investigation programmed in the exploratory gallery at Tarifa in Spain and the exploratory shaft at Malabata in Morocco. These structures were monitored during their construction in 1994–1995 and, subsequently, by means of recordings, until very recently. Although a significant amount of geotechnical information was gathered, probably sufficient for the feasibility studies, a vast field of investigation remains (hydrogeomechanical behaviour and natural stress in the undersea terranes to be undertaken in the final stage of the study process. In this regard on site investigation of the undersea terranes at significant depths, accessible from the Malabata shaft, will make a valuable contribution.

12. With regard to geophysical studies, the programmed — and completed — activities comprised not only new surveys, adding to the many geophysical surveys previously carried out, but also a new attempt to evaluate the likelihood of success of advanced (and costly) three-dimensional (3-D) seismic survey techniques to investigate the geological problems occurring. The results obtained from the tests carried out (acoustic measurement of the terranes in question and reinterpretation of old multi-channel profiles using advanced techniques) are far from conclusive, which leaves the issue of the relevance of carrying out a 3-D survey open to debate.

13. The 98 deep drilling survey — incontestably the most significant activity in the work programme — began in November 1998 and continued into 1999. In addition to activities undertaken in preparation for the drilling contract itself, the companies carried out preparatory activities included in the programme of work so as to reduce, as far as possible, the principal technical difficulties presented by the extraordinary system of sea currents in the straits. As a whole these preparatory activities produced satisfactory results and lowered the significant risk attaching to the drilling survey. The most noteworthy aspect of the results of the survey (March 1999) is that, despite progress in operational terms, which resulted in a near doubling of the maximum penetration achieved in the previous survey, the geological substratum sought in certain critical areas in the central part of the strait has still not been detected. On the other hand, the survey provided fundamental confirmation of basic geological hypotheses, which should lessen the problem and allow it to be clarified in future studies.

B. Engineering

14. Engineering activities were limited to revision of the preliminary pilot project for the basic option, adapted to a new reference profile which, with a gradient of 30:1,000 would, in theory, allow the geological faults detected by the BUCENTAUR 98 survey to be avoided, while maintaining the length of the tunnel and the emplacement of the terminals. The results are satisfactory in terms of the feasibility of using a steeper gradient (25 to 30:1,000) as well as the increase in construction costs as a result of using the gradient (11 per cent). These results confirm the findings of the 1997 preliminary study, which had previously anticipated the viability of steeper gradients with a moderate increase in costs (a gradient of around 35:1,000 and a cost increase of 14 per cent).

C. Socio-economic aspects

15. Most of the socio-economic activities programmed were completed. Besides the maintenance of the socio-economic and traffic database in the study area, work focused on implementation of the specific recommendations of the Joint Committee on increasing knowledge of traffic and long-term projection methods. This involved traffic flow monitoring and recalibration of the TRATAR-95 model.

16. Traffic flow monitoring activities related, as planned, to setting up a system of origin/destination surveys for Europe-Africa traffic in strait ports for one year (August 1997–August 1998), on the basis of between 2,000 and 3,000 enquiries per month. This operation is of great importance for calibration of the traffic models, and was carried out with the cooperation of the port authorities of Algeciras, Tangiers and Ceuta, which have also offered their cooperation in

continuing the system of surveys and in establishing other traffic flow monitoring elements.

17. Recalibration of the TRATAR model, with a base year of 1995, provided updated long-term projections in the study area, across the strait and across the fixed link. The results, in terms of traffic volume, confirmed previous results, although with slightly lower values (around 90 per cent) for passenger traffic and a steeper drop (80 per cent) for toll receipts. A new element introduced by the TRATAR-95 recalibration, however, is the high level of responsiveness of goods traffic over a fixed link to changes in the cost of transport by sea. As a result, a likely cost reduction of, for example, 30 per cent would reduce traffic by 70 per cent (rather than the 35 per cent estimated in previous studies).

D. Evaluation

18. Activities programmed under this heading related essentially to updating the economic-financial evaluation of the basic option and preparation of the end-of-stage report on the stage soon to be closed. These activities are still being carried out, and will be completed in 1999. They will relate to the amended basic option, in accordance with a recent revision of the pilot project. It should be noted that the delay will not affect the substance of the study process given the formal nature of the activities and the fact that it is not related to the next, "Investigation" stage. Further, the impact of the current amendments on the economic and financial evaluation is being monitored by the companies' technical services, without significant risk that the current evaluations will produce unexpected results.

II. Other project activities

19. A series of other activities has been undertaken or organized in the context of the project pursuant to Economic and Social Council resolution 1997/48. These activities include the organization, under the joint auspices of the regional commissions concerned and ITA, of a workshop on characterization of tunnel boring machines for tunnelling flyschs, held from 20–22 February 1997 at Tarifa, Spain, and a workshop on costs of tunnels bored with tunnel-boring machines (TBMs), scheduled for 22–24 April 1999 at Rabat, Morocco.

III. Future work

20. Studies on the fixed link project across the Strait of Gibraltar entered a new, F3. Investigation, stage of the feasibility phase, necessitated by the unexpected results of the 97 deep drilling survey. The results of this new stage will be decisive in improving geological knowledge of the undersea terranes of the strait and thus for the conduct of the project feasibility study.